

held in the peat bog is directly impounded from the rain, which the springs are not sufficiently heavy to replenish, thus the peat dries towards the end of the summer, when it is easily ignited and burns out to a considerable depth.

This repeated burning in recent years has considerably diminished the quantity of peat, and therefore a lesser quantity of water can be retained than formerly, the consequence being that whilst in the past a stream was said to flow from it, at the present day there is no indication of such a thing.

I therefore come to the conclusion that there is absolutely no prospect of obtaining a large permanent supply of water at this locality.

19-Mile Spring, Northern Railway.—Upon Loc. 613, about two miles south of Newmarracarra and close to the railway line, a series of small springs break out in a gully at the junction of the Jurassic rock with the granite. The uppermost one of them is very good potable water, but following down the creek they get saltier and saltier until they become quite briny.

There would be insufficient supply from these, but the idea advanced in favour of this locality was that by erecting a dam lower down the creek where there is a good site, that the impounded rain would be augmented by the springs.

This site is absolutely out of the question as the reservoir area is saturated with salt.

Northern Gully springs issue from a railway cutting, and are utilised by the Railway Department for a locomotive supply on account of the pure quality of the water, but the supply is quite inadequate for their own requirements.

In my opinion a supply derived from springs for the town is not worthy of further consideration as I do not consider there is the slightest possibility of obtaining a sufficiently large volume to meet the requirements of Geraldton.

Water Conservation.—Having carefully considered all the sources of water supply which came within the province of a geologist, and arrived at the conclusion that there is no hope of obtaining a sufficient supply of good potable water from any of them, brings us to the consideration of impounding surface water.

Strictly speaking, this is out of my province, as it is purely an engineering question, but still in travelling over the country I have been on the look out for any, to my mind, suitable situation; therefore the following remarks must be taken as suggestions only, whilst any further consideration must be left to the engineers.

The Bullen River crosses the Geraldton-Northampton road at a distance of about 9 miles north of the former town.

It takes its rise some four miles to the northward of this point, flowing down a wide valley, which is followed by the railway line to White Peak Station, when it turns abruptly to the westward, cutting a gorge-like channel through the ironstone and limestone capped granite hill to the sea.

In the upper portion of its course there are no sites suitable for dams, whilst from the tests made by the Resident Engineer, the water is not of a very good quality and of limited quantity, the greatest run off apparently taking place upon the hard ground below the railway line.

There are two good sites for dams here at points where the valley is contracted by granite bars, one being at the road crossing and the other a little lower down at the bottom of the Government Reserve. At

either of these a large body of water could be impounded, having a considerable depth at the dam head.

Owing to the fact that there are no indications of salt in the dried up rock pools in the bed, the conclusion arrived at is that the fresh water run off in this lower section far exceeds the saline water from its upper courses.

The only difficulty that I see in the matter is its elevation, which I should estimate roughly, taking White Peak Station as a starting point as the bottom of the lower site, only about 30 feet above Geraldton and the upper about 70 feet.

It would also be impossible to convey the water direct without pumping owing to intervening hills, but the mains might be laid down the valley and so round by the coast.

Before this scheme is seriously considered, it would be necessary to gauge the flow and sample the water, besides ascertaining accurately the levels.

Ego Creek is situated upon the eastern side of the Moresby and Flat Topped Range, about 6 miles from Geraldton. It takes its rise between the ranges and the Brothers, where there is apparently a very fine catchment area, the only question being if there is a suitable site for a dam further down its course, and from what I could see from a distance, I should judge that there would be one near Loc. 1380.

This would be an ideal site if practicable, since there is sufficient elevation to obtain a good head, the distance is short and the catchment area good and clean, therefore there would be every possibility of obtaining a large and good water supply.

There are doubtless many other suitable catchment areas in the Range and the neighbouring hills known to the local residents, which would be worthy of examination by an engineer. Such a piece of work would occupy three months at least, after which the selected and alternative sites would have to be tested.

Conclusion.—Having gone into this matter pretty fully, I think it will be apparent that the only feasible scheme is surface catchment, and if to this can be added natural gravitation it will be a great advantage. Although, perhaps, the initial cost may be greater, it will in the end prove to be more economical, whilst the quality of the water will be far superior if sufficient care is exercised in the selection of a site, and systematic sampling carried on throughout one rainy season before any scheme is adopted.

(4.) *The Mount Egerton Diggings, Peak Hill Gold-field.*

Situation.—These diggings are situated upon the north side of the Gascoyne River from which they are distant about eight miles, and about 10 miles south of Mt. Egerton trig. station.

The nearest postal town is Peak Hill which lies about 80 miles in a direct line to the south-eastward, the road of course being considerably longer and rather heavy for wheel traffic, whilst so soon as the claypans on this route dry up there will be a long stage without water.

Means of communication.—At the present time there are no facilities for communication with Peak Hill where there is a telegraph station and a weekly mail, or with Mt. Clare Station, a distance of 40 miles, which is the terminus of the Gascoyne River mail *via* Carnarvon. This latter is only a bi-monthly service.

Persons desirous of visiting the field must provide their own means of conveyance and stores, but fresh meat can be obtained at a reasonable rate from either

Mt. Clare, 40 miles down the river, or Milgan Station, about the same distance up.

Water Supply.—The Mines Water Supply Department have sunk a well in a central position where there is a large supply of good water at a depth of 79ft. 6in.

Physical Features.—The diggings lie in a basin-like valley surrounded by high rough hills which is traversed by a large creek that takes its rise near Mt. Egerton. This creek enters the valley upon the north side by cutting its way through a quartz conglomerate ridge, whilst it emerges from the south side through a defile in a lofty quartzite range. The surface of this valley is exceedingly rough, for where the sharp edges of the schistose rock do not protrude above the surface the flats are usually strewn with quartz and quartzite fragments.

Geology.—The rocks which comprise the auriferous zone consist of highly cleaved greenstones, quartz schists, and mica slates with occasionally small outcropping masses of a diabasic rock, whilst an intrusive mass of granite is met with at the north-eastern side of the valley.

The origin of these schistose greenstones is uncertain until analysis can be made, but the inference drawn in the field from this mode of occurrence is that they are metamorphosed sediments traversed by basic dykes. These rocks having only as yet been examined macroscopically in the field can only be described as quartz hornblende-mica schists merging upon the one hand into ferruginous quartz schists and upon the other into mica slates.

The granite intrusion which lies in a belt about 25 chains in width consist of ramifications from a magma into the adjacent country or it may be a series of independent dykes, the former being the most probable, but this point cannot be determined owing to the covering of detrital matter. The granite is one of the more basic types and may be classed provisionally as a hornblende granite or grano-diorite, but this point cannot be determined in the field from the weathered specimen obtained.

These schists have an almost universal strike east-north-east with an apparent dip at a high angle to the north (*i.e.*, the cleavage planes), whilst the quartzites, conglomerates and sandstones which form the parallel ranges upon the north and south of this valley strike in the same direction but exhibit a true bedded dip at an angle of about 19 degrees north upon the north side, and in the opposite at about the same grade upon the south, thus demonstrating that the valley is the axis of an anticline. Northward in the direction of Mt. Egerton a series of parallel east and west ranges are crossed composed of sandstones, quartzites and conglomerates, whilst near the base of the Mount itself, which is composed of quartzites, is a ridge of hard crystalline limestones.

Between these hill-ridges schistose rocks outcrop in the creek beds containing quartz veins and ferruginous formation, but these rocks are too highly hydrated to allow of their determination. In these valleys and flats there are low stony ridges formed by diabase outcrops, whilst extensive travertine flats indicate the presence of limestone or calcareous rocks.

The universal dip of about 20 degrees north of the harder belts of rock lead to the inference that a portion of the softer and highly cleaved rocks met with in the valleys belong to the same stratified series and are not wholly intrusive.

Beyond the quartzite range which forms the south side of the main valley are the large alluvial plains of the Gascoyne River south of which rises the remarkable range of hills known as the Saw Backs, which are composed of schistose rocks overlaid with quartzite dipping at a low angle to the northward.

The Auriferous Deposits.—This field is by no means a new discovery since it was worked for alluvial gold as far back as the early nineties, or contemporaneously with the Horseshoe diggings. No record, however, exists as to the quantity of gold obtained from it.

Later on, at some period unknown, a little work was done upon a quartz reef at the western end of the belt; here a shaft was sunk to a depth of some 25ft. and then abandoned. It was again visited last year by a prospector named Carey who pegged out the abandoned shaft, reported the discovery of payable gold and applied for a reward claim which he is still holding. This reported discovery attracted considerable attention, causing a mild rush to take place, but since the majority visited it in the hope of obtaining alluvial gold, they quickly departed, whilst others simply pegged ground and also left, not being financially strong enough to put in from six to twelve months' work without any return.

The first point that strikes one upon visiting these diggings is the great length of the auriferous belts, *i.e.*, rich prospects can be obtained along one line for a continuous length of two miles. The term "auriferous belt" has been used in counterdistinction to that of reef or lode, which latter have so far not proved to exist in this locality, the gold being contained in independent lenses of stone or formation of as a rule very short longitudinal extent, whilst in following the lens in an easterly direction (or westerly) the next lens of gold-bearing stone is found to be located within another line of the cleavage planes, either north or south, sometimes being divided by as much as 20ft. of clean country.

How these short lenticular bodies will behave in depth it is impossible to say until further development has taken place, but at one or two localities at which a little sinking has been done the results have not been altogether encouraging.

Carey's.—This area is the most eastern upon which gold has so far been discovered: it is situated upon a quartz-strewn hill upon the south side of a quartz and ironstone blow from which a series of barren reefs radiate.

A shaft was sunk upon a rich leader of quartz with a little casing carrying gold to a depth of about 12ft. when it cut out. From this point a crosscut was driven about 10ft. south in which another small vein was cut dipping to the north. The shaft was then sunk for a further depth of 15ft., at which point the small vein encountered in the crosscut was pierced, which, although not so rich as the first one, carried good values.

A little to the eastward of the shaft there is an open-cut in which the outcrop of the first lens is exposed: here it is small but rich enough to dolly. No length of outcrop has been traced, but since no effort has been made in this direction it is impossible to say more than that it indicates a lens of short longitudinal extent followed by others downwards, plunging to the westward and lying either north or south of the one immediately preceding it.

Schuman's Line.—This line has been pegged for a length of 102 chains in continuous leases, not includ-

ing a P.A. at the western end. It is situated upon a low range of schistose hills which lie upon the southern side of the main valley and about one mile west of the last-mentioned.

The Egerton North (T. Dunn), 12 acres.—Upon this lease there are two small holes: in the first or eastern, which is about 4ft. deep, there is about 3ft. of ferruginous quartz formation, a sample from which taken at the surface for a width of 5ft. is reported to have assayed 72s. About 20ft. north of this there is another small hole, in which a similar formation is met with, which is about 2ft. in width and said to be worth 84s.

Egerton Consols (E. Schuman), 12 acres.—Near the eastern boundary is a small hole about 12 inches deep, in which is exposed a 4ft. body of quartz formation said to be worth 42s. From this point westward a spur of the range is crossed, the next working being a shaft 36ft. in depth, in which the lode runs north-north-east dip at an angle of 80deg. to the west. It was about 3ft. 6in. at the surface, but dips out at the shaft bottom; the average value at the surface is said to have been about 45s.

A little to the southward there is a small hole in which 2ft. of stone is exposed, said to be worth 14s., whilst to the westward is another hole from which a sample is said to have returned by assay 145s.

Egerton Central (W. K. Messenger), 18 acres.—In this lease the direction of the veins swings back on to the general course of east-north-east, and in the first hole, in which there is 18 inches of stone, the assay is reported to have given a value of 608s., but in the next, in which the formation is 5½ft. in width, the values drop to 24s., and in the next little hole, where it is small, to 14s.

The next small hole is upon the western side of a ridge spur, from which a 3ft. sample is said to have returned 142s.

Egerton Consols Extended (E. Schuman), 12 acres.—In the first two small holes, in which the lode was small, the assay values are reported to have been 10s. and 32s., whilst at the next point a 5ft. 6in. body is reported to have yielded 118s.

At this point a shaft has now been sunk to a depth of 20ft., in which the formation rapidly decreases in size, and from samples drolled, also in value. It averages from 2ft. to 4ft. in width and has an underlay of 90 degrees to the north.

This shaft is at the head of the original dry-blowing patch, but so far this is the only gold-bearing vein discovered in this locality, whilst at two trenches sampled upon the east and west side of the patch, the values were only 13s. and 14s.

Mountain View (Lyons and Eber), 18 acres.—Over a range spur in which there are a considerable number of irregular but large barren quartz outcrops, which present the appearance of altered acidic dykes, there is a small hole from which a sample from a very wide outcrop returned 9s., whilst one further west, where there is only 1ft., is said to be worth 154s., and in the next 4ft. 6in. of stone 93s.

Mountain View South (Lyons and Eber), 18 acres.—Upon the south side of another range spur an outcrop is said to have prospected 264s., but this upon opening up rapidly decreased. From this point westward the formations follow the base of the range, and at this point a shaft is being sunk upon the underlay of a quartz body that was 5ft. 6in. at the surface, and was valued at 50s. It is down about 8ft.,

dipping at an angle of 60deg. to the north. The quartz is a good deal crushed and broken, and appears to have fallen over at the outcrop, but there is less formation than in the more eastern portion of the line. A little west of this point there is a small outcrop in which the stone is copper-stained.

Egerton South (W. R. Messenger), 18 acres.—To the westward of another spur a formation, having a total width of about 20ft., has been scratched, but this is said to only carry a trace, whilst in the four other small holes the formation, although large, was not of high value.

In the foregoing it will be noted that the assay values as given by the owner have been stated because there is no reason to doubt these judging from drolled samples, but since they are only from the outcrop of schistose formation there is every reason to expect that these high values will not maintain downwards.

In traversing this belt I completely failed, with the exception of one or two cases where holes were very close together, to trace any continuity in the bodies prospected; in fact in the majority of cases the lenses were unmistakably separated by continuous and unbroken bars of country. Thus the conclusion arrived at is, that they are a series of lenses perfectly unconnected, following a general direction in a belt of more or less crushed country, this extreme richness being largely due to concentration in the schistose formation.

Lindroo's No. 1.—This line of reef is situated about one mile to the north of the west end of the last mentioned. It outcrops upon a stony rise upon the north side of the creek not far from the southern gorge.

Only a small but pretty rich body of quartz was exposed at the surface, but this, when opened up to a depth of 10ft., increased considerably in size. It is, however, too broken and irregular to form any definite idea as to its exact dimensions. It was driven on in a westerly direction for a distance of 20ft., when another shaft was sunk, cutting it at this point, where it appears to consist of two or three quartz bodies with schistose parting, from one of which some very rich specimens of stone were obtained, whilst the whole of the quartz raised, to judge from prospects, should yield several ounces to the ton.

The cap of this quartz body has been opened for a length of about 30ft., all of which prospects well, but beyond this, although floaters can be found along the line of strike west-south-west for a considerable distance, only very small veins outcrop. These may of course increase in size downwards, but if so the reef will probably be of very variable size. The country here is much more solid, even at this shallow depth, than on Schuman's line, and will probably become pretty solid and hard at 30ft. or 40ft. below the surface. It is the prospectors' intention to sink 50ft. and then crosscut, which should give a fair idea of the character of the lode. There are several other leases pegged on this line, but practically no work has been done.

Lindroo's No. 2 line.—This is situated about 30 chains to the north of the last mentioned, where upon the cap on an outcrop of a blue quartz reef a shaft has been sunk to a depth of 20ft. At the bottom of this shaft, however, it becomes small. This reef is only of comparatively low value, but there is a large body of stone, whilst the reef can be traced for some little distance at the surface.

From this point a line of leases has been pegged for a distance of over a mile, but no work has been done upon them further than dollying a little stone.

McLaughlin & Gaffney.—This is situated upon the same belt of country as the last, and upon it the best defined and longest makes of stone as yet opened up at three diggings are being developed. The central or main line has been traced for a distance of 500ft., yielding good prospects, which are very high in places. At the eastern end the reef cap, which was completely covered by cement, has proved to be about 12ft. in width, but its average value is not yet known, as it has not yet been broken into, but pieces broken here and there gave high results.

A little west of this point a shaft is being sunk, and is now down 15ft., in which the reef averages 2ft. of solid rich stone, but what the average width of the lode will be it is impossible to state until it has been crosscut by trenches. There are also two parallel lines of stone, both of which prospect well, particularly one to the north at a point where it makes to a body about 5ft. in width.

It is of course impossible to state whether this is one continuous line of lode, as sufficient work has not as yet been done, but if it is not, the lenses will follow one another so closely that it will come to practically the same thing. The western end of these quartz veins appear to lose value at a point where a small creek crosses these, upon the other side of which are some blocky diabase outcrops. At the eastern end beyond the trench in which the large body of stone was cut, the superficial deposits increase in thickness, concealing all signs of the reef for chains, whilst at a point a little farther on, where the formations cross the main creek, there is no indication of a reef at all.

Farren and White's.—The next lease in this direction has been applied for by the above prospectors, who have been unable to locate the reef but discovered a formation about 4ft. in width which prospected well. Upon this they sunk a shaft, following it to a depth of 32ft., in which it pinched out at a depth of 10ft., but upon continuing this sinking upon the planes of the country another lens was encountered at a depth of 20ft. which has opened out to a width of 4ft. at the bottom and is estimated to go $\frac{1}{2}$ oz. per ton.

These bodies lie upon the cleavage planes of the country at an angle of 70 degrees north and strike east-north-east with a decided pitch to the west, the lower lens outcropping in a hole sunk about 30ft. to the east of the shaft. The country is very schistose and will probably remain 20ft. down to water level, about 30ft.

This belt has been traced for about another 25 chains in an easterly direction until it strikes the granite dykes, but in this distance, although some fine prospects can be obtained, no body of stone or formation has been opened up.

Conclusion.—From a careful examination of these various rich outcrops I have arrived at the following conclusions. A number of rich lenses of quartz upon the northern lines, and formations upon the southern, follow the direction of the cleavage planes of the rock, but do not live in one continuous fissure. These in places undoubtedly so nearly approach one another, that they may be treated as one continuous body, whilst in others they are separated sometimes longitudinally and sometimes laterally by considerable width of barren ground. This lenticular habit will also be found to exist in depth, that is, the out-

cropping body will cut out, to be followed in a splice-like manner by another similar body.

The great richness of some (particularly in the case of the formations) of these bodies at the surface is undoubtedly due to surface concentration, a portion of the gold being derived from the denuded portions of the same vein; therefore these values will not be maintained in depth, whilst further, the second and third lenses met with in sinking will not be so rich as those outcropping. The present values of these lodes is entirely dependent upon the character of the unaltered country rock below the water level, where, should this prove to be a massive diabase, the values will rapidly drop, whilst, on the other hand, if the schists continue downwards, values will in all probability also do so.

General.—Being the only officer of the Mines Department who has visited this field, I may be excused for diverging slightly from the province of our own department to deal with the general conditions existing here and the prospects of those engaged in the work of opening the field.

To start with: I find that the great difficulty experienced in developing this centre is the want of funds, with a superfluity of which the ordinary prospector is not usually blessed. Many good men have had to take their departure simply for the reason that they were not financially strong enough to wait and develop promising reefs which they had discovered. This, following the statement made above with regard to the values of the stone, may appear strange, but when it is stated that gold is rarely visible in stone even when it may be contained at the rate of 10ozs. to the ton, it will be understood that a living cannot be made by the aid of the dolly-pot.

In consequence of this, only those who had a good banking account or substantial backing have been able to stay, whilst a large number of those are waiting in the hope of effecting a sale. The question of carting stone to Peak Hill is out of the question, for it will take fully $1\frac{1}{2}$ oz. stone to pay cartage and crushing charges; therefore only small and very picked parcels could be profitably sent; whilst further, the loss of time in seeing their parcels through the mill would be considerably accompanied by personal expenses. Yet here the difficulty arises in formulating a recommendation, for owing to the small amount of work as yet performed it is quite impossible to form any estimate as to the quality of stone *in situ*. Therefore it would be decidedly premature to recommend the erection of a Government Battery, which is practically the only method by which this field could be opened up. The only two temporary expedients that suggest themselves to my mind that would enable the struggling prospector to develop his show are: first, substantial assistance towards the carriage of trial samples of, say, up to 100 tons, to the nearest State Battery; or, subsidised sinking and driving below a depth of, say, 50ft.

If either of these were offered by the Government, and availed of by the prospectors, in six months' time this locality should be sufficiently developed for an official to report upon the prospects of a State mill finding work to do.

There is no doubt but that there is a considerable quantity of rich stone in sight, and that a battery here would give a considerable impetus, not only to the work upon the present holdings, but to the prospecting of others. Still, as this country is entirely different to any of the other localities in which permanent reefs have been discovered in other portions

of the State, and may closely resemble those in which values were rapidly lost in depth, it would be decidedly premature to recommend the erection of a crushing plant here until at least one of the rich bodies had proved to carry its values down to at least the water level.

(5.) *Report upon the May Queen G.M.L. 852 (Yilgarn Goldfield), with regard to the loss of the reef due to faulting.*

Acting upon instructions dated November 9th, 1910, I placed myself in communication with Messrs. Liddle and Donley, the owners of the above property, which is situated about 14 miles to the southward of Southern Cross.

After crossing the lake to the southward of the above township the auriferous belt is traversed for a distance of 14 miles, the schistose amphibolites being for the most part covered by a thin deposit of soil, but occasionally patches of mica indicate the presence of granitic dykes, or tracts of dark-red clay with weathered fragments of massive greenstone basic dykes.

At the mine itself the weathered amphibolitic schists are found to extend downwards as far as the bottom workings with so little change that it is probable that at least another 40ft. will have to be sunk before the solid rock will be met with at or near the ground water level.

The reef does not outcrop, but was located by small but rich flat stones after which trenching, and costeen proved a small vein striking nearly north and south to extend for a distance of about 100ft.

To the southward of this it is lost, being apparently displaced by a series of granitic dykes which cross it at an acute angle. This reef, which averages about 6in. in width, may be said to underlie to the westward, but so slight is the dip that it is still in the shaft at a depth of 100ft.

This reef has been driven at the No. 1 or 60ft. level for a distance of 70ft. At the No. 2 or 100ft. level the stone was very rich, and was tracked for about the same distance as in the No. 1 level in a northerly direction, but at the shaft bottom it is sharply cut off by a fault which strikes north-west and south-east and dips to the eastward.

In the northern portion of the bottom level a winze has been sunk to a depth of 30ft. in which the fault was met with at a depth of 15ft., below which the reef was lost; whilst in a crosscut a little north of the winze driven west the fault line was cut at a distance of 20ft., followed a little farther on by a large barren white quartz reef which is exposed upon this side of the auriferous vein at the surface. This would appear to indicate the absence of the small rich vein upon the western side of the fault, but to my mind it is inconclusive in so far that the crosscut was driven at a point some 20ft. above the fault intersection of the vein.

I would therefore advise that a crosscut should be driven at the bottom of the winze in a westerly direction, when if the large barren reef is first cut, it may be safely concluded that the small rich one has died out upon the slide, and further exploiting may be discontinued.

Several crosscuts have been driven in an easterly direction for a considerable distance in barren country, but since this work was executed upon the same side of the fault as the reef already exists, it was not to be expected that it would be cut again.

By crosscutting at the winze bottom the vein, if it exists, should be cut in something less than 20ft.

from it, since the main barren reef located in the 100ft. level crosscut was met with at 40ft. from that level upon the western side of the fault, and since it lies about 20ft. to the westward of the outcrop of the small veins. In my opinion there is a very good prospect of the rich vein being cut upon the western side of the fault, which appears to be quite normal, making a clear cut of the reef which is a fissured plane, judging from the walls.

CHAS. G. GIBSON, Assistant Geologist.

(6.) *Some Notes on the Principal Geological Features of the Kalgoorlie Goldfield.**

The importance of Kalgoorlie, which has been responsible for more than one half of the total gold yield of the State, renders some reference to its salient geological features necessary, by way of preface to the series of articles on mining practice, for experience in most mining fields of the globe has shown that many mining failures have been due rather to a want of knowledge, or true appreciation of, structural geology than to any lack of engineering training.

General Topography.—The chief topographical feature of the Kalgoorlie goldfield is a main central ridge of hills trending roughly north-north-west and south-south-east, and reaching its maximum altitude in Mt. Gladden—better known as Maritana Hill—which rises to a height of some one hundred and fifty feet; the ridge has a length of about four miles and dies out in a southerly direction just beyond the south end of what are known as the "Boulder Belt" mines. On each side of this central ridge are wide flats draining southerly and extending laterally on the eastern side for, say, five miles, and on the western for about three. On the east side of the eastern valley is another rather more conspicuous ridge of hills also trending roughly north-west and south-east and having a maximum altitude of possibly a couple of hundred feet; along this ridge of hills are situated the mining centres of Boorara and Waterfall (Golden Ridge). The western flats are also in their turn flanked by a low ridge of hills, less conspicuous at their northern end but well defined at their southern. Both the eastern and western valleys—if they may be termed such—drain, as before stated, southerly into the extensive salt lake or marsh known as Gnumballa or Hannan's Lake, which starts but a short distance south of the Boulder Mines and trends away in a south and south-westerly direction for many miles. On the western side of this salt marsh and some three miles to the south of the Boulder mines is a small conspicuous clump of hills, having their highest point in Mt. Hunt, the most prominent landmark in the district, which rises to a height of possibly some four hundred feet. These hills are more or less connected—by a westerly extension—to the main western ridge.

The town of Kalgoorlie is situated on the western fall of the main central ridge northwards from its middle point, and the mines are along the line of the ridge, the "Golden Mile" being at its southern end, the underlying rocks of the valleys being—as will be explained later—non-auriferous, or practically so.

General Geology.—The original rocks of the Kalgoorlie district were of sedimentary origin, viz., shales, soft sandstones, grits, conglomerates, etc.—with possibly interbedded lava flows—laid down horizontally in probably pre-Cambrian time on a gneissic or granite floor; these were by earth movement afterwards tilted into their present highly inclined posi-

* This report has been printed by the Chamber of Mines of Western Australia, to the Council of which the Department is indebted for permission to republish it.